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SYNOPSIS OF AUSTRALIAN PASSALIDAE (COLEOPTERA)

By John R. Dibb.

With Two Text-figures.

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I. Introduction.

This paper follows recent studies of the subfamily Aulacocyclinae in which more than one-third of the Australian species of Passalidae have been differentiated and an attempt was made to bring the synonymy up to date. The completion of similar studies on the remaining Australian species affords an opportunity of combining the results in a brief synopsis of the Australian Passalid fauna.

The systematic literature on the Passalidae is not extensive considering the biological significance recorded by Ohaus (20) of the "first" of the Lamellicorn families. So far as is known, the family is unique in the Coleoptera in that the larvae are entirely dependent upon their parents. The parent beetles are said to triturate the wood for their offspring, the mandibles of the latter not being capable of breaking down the fibres for their nourishment. Both larvae and adults are provided with stridulating apparatus.

The early monographs of Percheron (21) and Kaup (15) contain a small proportion of Australian species and need not be particularised here. Masters' (19) synonymical catalogue of the Australian species should be mentioned as one of the important early records.

The monograph of Kuwert (16) (17) (18), compiled in tabular form with the descriptions of his many new species inserted in the tables of species, is a complicated work to follow. The comparatively small number of examples of each species (in many cases single specimens) which he examined could not give a true indication of the extent of the variation in many of the species with the result that numerous descriptions have been subsequently found to be superfluous. The unfortunate decease of the author before the proofs were checked no doubt accounts for a number of errors in the text. Nevertheless this was the first extensive work on the family and the labour entailed in its detailed compilation must have been great. Thirty-seven species were said to be of Australian origin, but subsequent synonymy reduces this number to twenty-one.

Gravely's (14) revision of the Passalidae of the world in 1918 is the most comprehensive recent work on the family, and outlines, for the first time, a sound classification admirably supported by the distributional data, but it was

not intended to embrace the whole of the described species. Twenty-one Australian species were included.

The Passalid fauna of Australia is not an extensive one. Out of 490 species comprising the present total number of PASSALIDAE of the world, only thirty-three have been recorded from Australia. Although the latter number is comparatively small three of the seven subfamilies are represented.

The distribution in Australia is bounded by the wet forest regions and the greater proportion of the species (more than fifty per cent.) has been recorded from Queensland. The similarity of the Coleopterous fauna of Cape York, Queensland, and that of the south-eastern portion of New Guinea has been established by the distributional data in many families, amongst which the PASSALIDAE is no exception. Ten species are common to both regions. *Pharochilus politus* is apparently the only recorded species in Tasmania.

It has not been possible to search the local lists of records in which miscellaneous Coleoptera appear, so that detailed information on the distribution of each species within Australia is not covered by this paper.

The present paper indicates, in Sections IV and V, several alterations in synonymy and includes one additional genus and species (*Notocetius cornutus* Hincks & Dibb) to the *Coleopterorum Catalogus* (11) 1935.

II. ACKNOWLEDGEMENTS AND SOURCES OF MATERIAL.

Some of the material from which the systematic section of this paper has been compiled was kindly loaned by the authorities of the British Museum, London, and of the German Entomological Museum, Berlin-Dahlem, to whom I wish to express my thanks and appreciation for the opportunities afforded of taking notes from their collections.

The remaining material, with the exception of the paratype of *Cetejus obliquus* Kirsch (in the Dresden Museum), is in the Hincks–Dibb collection.

III. EXTERNAL ANATOMY AND TAXONOMY.

Head and Cephalic Appendages.

The most important characters for the differentiation of the genera are connected with the head or its appendages. In most species the upper surface bears a complicated arrangement of tubercles and ridges often of characteristic configuration in separate species, but usually of constant specific form.

In the AULACOCYCLINAE the ridge pattern is much more simple than in the other two Australian subfamilies, due to the absence of the parietal and frontal carinae and inner and outer tubercles. The usual type of ridge and tubercle pattern in the MACROLININAE and LEPTAULACINAE may be described as follows. From the base of the central tubercle the parietal carinae extend laterally. The supra-occipital carina runs across the posterior part of the head behind the parietal carinae and is joined on each side by the oblique supra-orbital carinae running above the eyes to the anterior margin of the head. Proceeding from immediately in front of the central tubercle, oblique ridges, termed the frontal carinae run out towards the anterior margin and upon reaching it continue by projecting over, forming the outer tubercles. At some point on the frontal carinae, between the central tubercle and the outer tubercles, are the inner tubercles joined by a transverse ridge (MACROLININAE type). Alternatively the frontal carinae may be angulate about the middle, turning straight towards

the anterior margin, where they terminate in the inner tubercles projecting over the anterior margin, when the outer tubereles are situated between the inner tubercles and the anterior angle of the head (LEPTAULACINAE type).

Some of the tubercles and portions of the frontal carinae may be obsolete, and the angles formed by the ridges at various points vary greatly in different species so that an almost unlimited number of head designs is possible. Some specimens can be classed as " old " at a glance, due to the appearance of the cephalic ridges and tubercles which have been ground down through wear. This feature must not be overlooked when using such processes for differentiation purposes.

With a few isolated exceptions, the number of lamellae to the antennae remains constant within the subfamilies.

The mandibular structure is of great taxonomic value as it provides constant characters for the separation of genera by the reduction or duplication in the development of the teeth.

The head is often asymmetrical and the mandibles of unequal development. The genera containing asymmetrical species are referred to in Section IV below.

The shape of the labrum can occasionally be used as a confirmatory specific character. Of greater value is the shape and sculpture of the mentum which often bears characteristically formed scars, piligerous punctures or grooves. In the genus *Gonatas* Kaup, the mentum structure is of particular significance.

Thorax and Thoracic Appendages.

The presence or absence of a medium sulcus or line on the upper surface of the thorax is sometimes a useful confirmatory specific character. The punctation of the thorax, the shape and sculpture of the marginal grooves, the formation of the scars in the posterior angles and the presence and extent of hair are all characters of taxonomic importance.

The portion of the scutellum which is not covered by the bases of the elytra sometimes bears circumscribed areas of punctures or patches of hairs. It is evident that Kuwert considered the scutellary sculpture and clothing of taxonomic value owing to the many references to it in his monograph (16) (17) (18), but Gravely (13) considered most of these characters variable in individuals of a single species, and I am in agreement with the latter view.

The type of punctation and its extent on the mesothoracic episterna, however, has been found to be fairly constant to the species. The surface of the mesosternum varies greatly in different species and also, in many instances, in individuals of the same species, so that it is always necessary to test this character throughout a series of examples of the same species before it can be introduced into the taxonomy of a group. The shape or absence of mesosternal scars are more reliable characters.

The only other portion of the thorax which need be mentioned is the metasternum, which can usually be divided into three recognisable parts.

1. The plate consisting of the middle area, which is usually flat, impunctate and shining, but occasionally grooved and punctate.

2. The intermediate areas, being the portions bordering the plate sloping towards the lateral areas upon each side. The surface may be punctate, hirsute or smooth and the extent of such areas should be indicated.

3. The lateral areas or extreme lateral margins which not only vary in the type of surface but in proportionate width, usually offering several characters of value towards specific differentiation. The fusion of the lateral and intermediate areas has been considered a character of generic importance.

The anterior coxae present a character upon which to differentiate the AULACOCYCLINAE from the remaining subfamilies, for their apices project downwards to a greater distance in the AULACOCYCLINAE. Apart from this important character, the legs are of little use for differentiating the species. The absence or presence of outer tibial spines can sometimes be referred to as a confirmatory point.

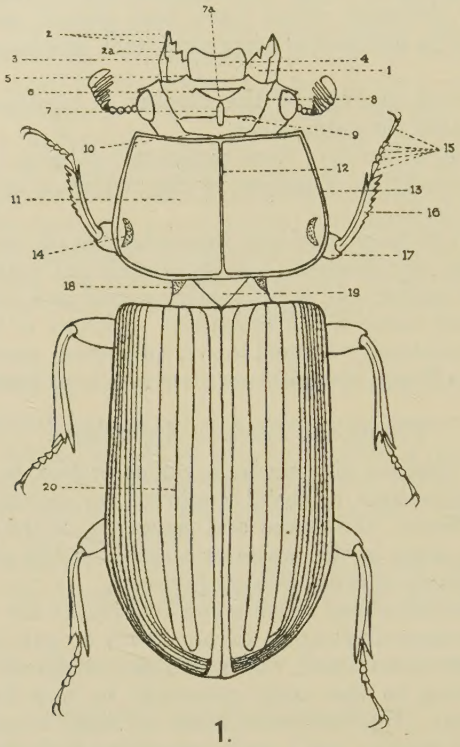

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FIG. 1.—Dorsal aspect of *Mastochilus polyphyllus*. 1. right mandible; 2. terminal teeth; 2*a*. anterior lower tooth; 3. upper tooth; 4. labrum; 5. outer tubercle; 6. inner tubercle; 7. central tubercle; 7*a*. frontal area; 8. supra-orbital carina; 9. parietal carina; 10. supra-occipital carina; 11. pronotum; 12. median groove of pronotum; 13. lateral marginal groove of pronotum; 14. pronotal scar; 15. anterior tarsus; 16. anterior tibia; 17. anterior femur; 18. mesothoracic episternum; 19. scutellum; 20. third elytral groove.

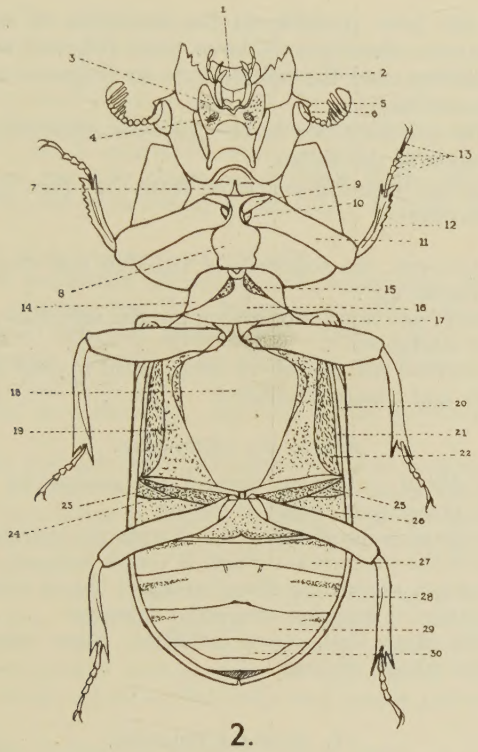
Abdomen.

The punctation of the abdominal tergites can only rarely be used as a constant specific character varying in type and extent between the species. Piligerous punctures sometimes occur, when the rarity itself makes the character of value. Abdominal scars or depressions are often present but are of little taxonomic importance.

Elytra.

There are few characters suitable for taxonomic use in the elytra. Many have been overrated in early descriptions. The features of importance are the

type of the punctation in the lateral striae, often so transverse as to form rectangular divisions of the striae in which they occur, the presence or absence of punctures in the dorsal striae, the width and nature of the interstices (whether flat, rounded, smooth or wrinkled) and, if present, the localisation and extent of the surface covered by hair.



2.

FIG. 2.—Ventral aspect of *Mastochilus polyphyllus*. 1. labrum; 2. mandible; 3. mentum; 4. primary scar of mentum; 5. canthus; 6. basal segment of antenna; 7. anterior prosternal plate; 8. posterior prosternal plate; 9. trochanter; 10. part of coxa; 11. anterior femur; 12. anterior tibia; 13. anterior tarsus; 14. mesothoracic episternum; 15. mesosternal scar; 16. mesosternum; 17. elytron; 18. metasternal plate; 19. intermediate area of metasternum; 20. flange of elytron; 21. metathoracic episternum; 22. lateral area of metasternum; 23. part of hind coxa; 24. part of hind coxa; 25. first abdominal sternite; 26. second abdominal sternite; 27. third abdominal sternite; 28. fourth abdominal sternite; 29. fifth abdominal sternite; 30. sixth abdominal sternite.

Fusion of the elytra, usually accompanied by other characteristics, occurs in some species, but not, to my knowledge, in any of the Australian forms. Reference may be made to the paper by Hincks (9) which summarises the knowledge on this subject.

Reference to figs. 1 and 2 will indicate the position of the parts mentioned above.

The sexes cannot be differentiated in the PASSALIDAE by external characters.

IV. Systematic Section.

The basic characters used by Gravely (13) (14) for the differentiation of subfamilies and genera have been adopted where applicable. The key to the species of *Aulacocyclus* is that which I published in 1932 (5) with the appropriate alterations regarding synonymy and the inclusion of a subsequently described new species.

Where it has not been possible to see examples of certain species, the original and subsequent descriptions have been referred to for the isolation of the specific characters, and the reference to such species in the tables below is marked with an asterisk.

The length of the species given in the tables is measured from the front of the labrum to the apex of the elytra.

The Passalidae has been differentiated from the other Lamellicorn families by Arrow (1) as follows :—

I. Antennae not elbowed, the segments of the club not very thin, brought together by rolling up . . . . . Passalidae.
II. Antennae elbowed, not capable of rolling up, the segments of the club not very thin nor coadapted . . . . . Lucanidae.
III. Antennae not elbowed nor capable of being rolled up, the segments of the club very thin and closely coadapted . . . . . Scarabaeidae.

Key to the subfamilies.

1. Anterior coxae distad projecting beyond the surface of the intercoxal portion of the prosternum, which is hidden . . . . Aulacocyclinae.
   Anterior coxae distad approximately level with the surface of the intercoxal portion of the prosternum which is visible between them . . . 2.
2. Antennae having not more than three lamellae; inner tubercles situated on anterior margin of head between outer tubercles . . Leptaulacinae.
   Antennae having more than three lamellae; inner tubercles situated behind anterior margin of head . . . . . Macrolininae.

I. Aulacocyclinae.

1. *Aulacocyclus* Kaup.

Key to the species.

1. Supra-orbital carinae united posteriorly across vertex; pronotal scars narrow and irregular; lateral striae of elytra distinctly punctate; anterior tibiae broad. Length : 27 mm. . . . . *macleayi* Kaup.*
   Supra-orbital carinae separated posteriorly . . . . . 2.
2. Lateral areas of metasternum very broad; species 35 mm. or more in length; antennal lamellae rather short and thick; central tubercle elevated, bent forward at an obtuse angle; anterior marginal sulcus of pronotum impunctate; dorsal elytral striae shallow, impunctate, lateral striae with obsolescent punctures. Length : 35–40 mm. *teres* Perch.
   Lateral areas of metasternum not very broad; species less than 35 mm. in length . . . . . 3.
3. Central tubercle depressed, seen from above in the form of a wide U-shaped carina; supra-orbital carinae somewhat depressed; antennal lamellae of average length; pronotal scars small; dorsal elytral striae indistinctly

punctate, lateral striae shallower, the punctures more distinct. Length : 23–27 mm. . . . . *deyrollei* Kaup.

Central tubercle elevated and/or pedunculate . . . . . 4.

4. Central tubercle, seen from above, with a narrow U-shaped carina, viewed laterally, the tubercle forms a large hump with its anterior face almost vertical from anterior margin of head to apex of central tubercle *gravelyi* Dibb.

U-shaped carina on central tubercle obsolete . . . . . 5.

5. Central tubercle having dorsal groove from cleft apex . . . . . 6.

Dorsal groove of central tubercle obsolete, central tubercle tall, steeply inclined and gradually curved forward, the anterior face almost vertical; antennal lamellae long and slender; primary pronotal scars small, narrow and punctate, small secondary scars present; lateral areas of metasternum almost smooth; elytra rather short, dorsal striae deep, lateral striae shallower, all striae regularly punctate. Length : 25 mm. *rosenbergi* Kaup.

6. Central tubercle pedunculate, not depressed . . . . . 7.

Central tubercle somewhat depressed, not pedunculate, short and stout, apex blunt; antennal lamellae of average length; pronotal scars deep, angular; lateral areas of metasternum finely rugose; dorsal elytral striae impunctate, lateral striae distinctly punctate. Length : 23–28 mm. . . . . *mastersi* MacLeay.

7. Central tubercle, seen laterally, angulate, apical portion approximately horizontal . . . . . 8.

Central tubercle, seen laterally, not angulate, apical portion not horizontal 9.

8. Apical portion of central tubercle considerably longer than upright basal portion; labrum anterior margin strongly incised; antennal lamellae short; dorsal and lateral elytral striae deep and coarsely punctate. Length : 27–29 mm. . . . . *kaupi* MacLeay.

Apical portion of central tubercle not longer than upright basal portion; vertex punctate; anterior angles of pronotum prominent, anterior marginal groove much dilated and punctate; lateral areas of metasternum rather broad; sutural striae of elytra more deeply impressed than lateral striae, all striae distinctly and evenly punctate. Length : 22–28 mm. . . . . *errans* Blkb.

9. Antennal lamellae at least five times as long as broad . . . . . 10.

Antennal lamellae less than five times as long as broad; central tubercle strongly elevated and, more or less, arcuate, seen from above with bifid apex; lateral areas of metasternum finely rugose; elytral striae deep, the punctures therein obsolescent. Length : 23–30 mm. *edentulus* MacLeay.

10. Punctures in elytral striae coarse and large; central tubercle almost vertical; pronotal scars simple in shape, deep and punctate; lateral areas of metasternum rugose. Length : 20–22 mm. . . *collaris* Blkb.

Punctures in elytral striae minute but distinct; central tubercle short, seen laterally, with anterior face almost vertical; pronotal scars narrow and punctate, secondary scars sometimes present; lateral areas of metasternum almost smooth; all striae of elytra deep. Length : 20–26 mm. *aliicornis* Kuw.

II. Macrolininae.

Key to the genera.

1. Frontal carinae obsolete; anterior margin of head produced and tuberculate; parietal carinae at right-angles to central tubercle; central

tubercle widely free, pedunculate, flattened dorsally with a distinct median depression and bifid apex; elytra punctate, lateral striae appearing as matt bands bearing small median punctures, interstices laterally alutaceous . . . . . *Notocetius* Hincks & Dibb.

Frontal carinae present . . . . . 2.

2. Mentum with distinct primary scars; lateral and intermediate areas of metasternum distinct . . . . . 5.

Mentum without definite primary scars; or, lateral and intermediate areas of metasternum fused . . . . . 3.

3. Lateral and intermediate areas of metasternum not fused . *Gonatas* Kaup.

Lateral and intermediate areas of metasternum fused . . . . . 4.

4. Dentition of both mandibles complete, normal; mandibles more or less symmetrical . . . . . *Labienus* Kaup.

Dentition of both mandibles reduced, especially that of the left one; anterior lower tooth (when present) widely separated from the middle lower tooth, and partially fused with the lowest terminal tooth *Protomocoelus* Zang.

5. Mentum laterally with narrow depressed, matt border, or more extensively matt; antennal lamellae very short; always symmetrical *Pharochilus* Kaup.

Mentum uniformly glossy; antennal lamellae longer . . . . . 6.

6. Robust symmetrical species, at least 35 mm. long . . . *Mastochilus* Kaup.

Smaller species, never more than 34 mm. long; often asymmetrical . . 7.

7. Upper margin of left mandible distinctly angulate; antennal lamellae very long; form more flattened . . . . . *Analaches* Kuwert.

Upper margin of left mandible, behind upper tooth, not or scarcely angulate; antennal lamellae shorter; form more cylindrical . . . . *Cetejus* Kaup.

2. *Mastochilus* Kaup.

Key to the species.

1. Anterior margin of mentum with median V-shaped sulcus cutting off a small, shining triangular plate; frontal area transverse; inner tubercles united by transverse carina; median pronotal sulcus distinct, entire; dorsal elytral striae with obsolescent punctures, lateral striae distinctly punctate. Length: 35–40 mm. . . . . *polyphyllus* MacLeay.

Anterior margin of mentum without median V-shaped sulcus . . . . 2.

2. Transverse carina between inner tubercles shorter than the oblique frontal carina from central tubercle to inner tubercles, or, obsolescent . . . 3.

Transverse carina between inner tubercles much longer than the oblique frontal carinae from central tubercle to inner tubercles; frontal area not equilaterally triangular, transverse and in normal plane, shining; head surface between anterior margin and frontal area, rugose; median pronotal sulcus obsolete, scars punctate; dorsal and lateral elytral striae punctate . . . . . *australasicus* Perch.

3. Transverse carina between inner tubercles abutting on to the tubercles; inner tubercles very close together, raised almost to level of central tubercle; frontal area approximately equilaterally triangular and on higher plane than general surface of head. Length: 45–53 mm. *quaestionis* Kuw.

Transverse carina between inner tubercles obsolescent; outer tubercles broad and pointed. Length: 39 mm. . . . . *parvifrons* Kuw.*

3. *Pharochilus* Kaup.

Key to the species.

1. Inner tubercles widely separated; frontal area bounded by frontal carinae between central tubercle and inner tubercles and/or uniting the inner tubercles . . . . . 2.
   Inner tubercles closely approximated, very near to the central tubercle; frontal carinae between inner tubercles and outer tubercles and carina uniting inner tubercles obsolete; surface of head between anterior margin and apex of frontal area rugose; matt portion of mentum limited to extreme lateral margins which are smooth. Length: 31 mm. *punctiger* Grav.
2. Impressions in lateral elytral striae not strongly transverse, punctures approaching transverse form in not more than the five marginal striae . 3.
   At least six lateral elytral striae bearing transverse impressions; narrow lateral margins of mentum matt; inner tubercles large, widely separated; frontal area transverse. Length: 28–32 mm. . . . . *dilatatus* Dalm.
3. Lateral lobes of mentum with narrow, matt border to outer margins . . 4.
   Lateral lobes of mentum with broad, matt margins or entirely matt . . 5.
4. Scutellum punctate; elytral striae deep, interstices rather flat. Length: 36–39 mm. . . . . *scutellonotus* Kuw.
   Scutellum impunctate; elytral striae fine, interstices very flat. Length: 38 mm. . . . . *nitidulus* MacLeay.
5. Frontal area approximately triangular; a secondary tubercle present at base of each outer tubercle on the frontal carinae; central plate of mentum impunctate. Length: 32–37 mm. . . . . *politus* Burm.
   Frontal area narrowly crescentic; central plate of mentum with a few punctures towards anterior margin. Length: 35 mm. *puncticollis* MacLeay.

4. *Analaches* Kuw.

The single Australian species may be diagnosed as follows:—

Outer tubercles large, left larger than right; frontal area approximately twice as broad as long; mentum with matt secondary scars, a central shining area on the anterior margin; pronotum punctate laterad, punctures concentrated around scars; median pronotal sulcus obsolescent; all elytral striae punctate, punctures in lateral striae transverse, forming secondary transverse carina which become obsolescent in outermost striae. Length: 26–30 mm. . . . . *australiensis* Stol.

5. *Cetejus* Kaup.

The single (?) Australian species may be diagnosed as follows:—

Form convex; antennal lamellae moderately short; outer tubercles flat, attenuated; inner tubercles, more or less, elevated, united by a distinct carina; parietal carinae straight; central area of mentum impunctate, secondary scars indistinct, a wide sulcus present parallel with anterior margin; anterior angles of pronotum with sparse punctures which are concentrated around the scars, median sulcus distinct; mesosternal scars subovoid, rugose; punctures on anterior intermediate areas of metasternum extending to lateral areas, posterior intermediate areas extensively punctate; apex of metasternal plate punctate; dorsal elytral striae punctate, punctures in lateral striae more distinct, not transverse. Length: 31–34 mm. . . . . *obliquus* Kirsch.

6. *Notocetius* Hincks & Dibb.

Monospecific genus.

Antennal lamellae short, basal three very short; frontal area large, shield-shaped, dull and rugose; pronotum transverse, median sulcus distinct, lateral grooves discontinuous posteriorly, very broad cephalad, marginal grooves widely separated, broad and like the lateral grooves, granulate; elytral punctation distinct throughout, stronger laterally, not transverse, lateral striae appearing as matt bands bearing small punctures medially; apex of elytra dull; lateral areas of metasternum narrow with piligerous punctures, anterior intermediate areas with hair-bearing punctures. Length: 29–31 mm. . . . . *cornutus* Hincks & Dibb.

7. *Labienus* Kaup.

The single Australian species may be diagnosed as follows:—

Anterior margin of labrum strongly concave; primary mentum scars small, secondary scars large, almost touching in middle line; left outer tubercle directed inwards, larger than right; frontal carinae obsolete anterior to inner tubercles; median pronotal sulcus entire; posterior intermediate areas of metasternum almost impunctate and hairless, lateral areas with piligerous punctures. Length: 37·7–38·7 mm. . . . *inaequalis* Grav.

8. *Protomocoelus* Zang.

The single Australian species may be diagnosed as follows:—

Frontal carinae obsolescent posterior to the inner tubercles; right outer tubercle equal in length to left but more attenuated; median pronotal sulcus obsolete; dorsal and lateral striae of elytra equally distinctly punctate. Length: 36–45 mm. . . . . *australis* Boisd.

9. *Gonatas* Kaup.

Key to the species.

1. Posterior margin of mentum strongly concave, the scars more angulate 2.
   Posterior margin of mentum arcuate, the scars more rounded . . . . 4.
2. Left mandible more elongate than right . . . . . 3.
   Left mandible not more elongate than right; antennal lamellae long; lateral areas of metasternum having piligerous punctures; elytral striae punctate; punctures in lateral striae larger than those in dorsal striae. Length: 28–32 mm. . . . . *schellongi* Kuw.
3. Antennal lamellae short and thick; posterior margin of mentum inverted V-shaped with apex rounded; outer tubercles narrow; lateral areas of metasternum punctate and hirsute; dorsal and lateral elytral striae punctate. Length: 23–29 mm. . . . . *naviculator* Perch.
   Antennal lamellae long and thin; posterior margin of mentum not inverted V-shaped; anterior lower tooth of left mandible obsolescent; dorsal and lateral elytral striae punctate. Length: 31–33 mm. *germari* Kaup.
4. Dentition normal; antennal lamellae short; punctures in dorsal and lateral elytral striae almost equally distinct. Length: 20–25 mm. *minimus* Kuw.
   Dentition of left mandible reduced; antennal lamellae long and narrow; punctures in dorsal striae less distinct than those in lateral striae. Length: 18–23 mm. . . . . *pumilio* Kaup.

III. Leptaulacinae.

10. *Leptaulax* Kaup.

Key to the species.

1. Parietal carinae and supra-orbital carinae united; lateral areas and marginal grooves of pronotum with large punctures; central plate of metasternum usually bearing numerous small punctures, posterior intermediate areas entirely punctate. Length: 12–24 mm. . . . . *bicolor* Fab.
   Parietal carinae and supra-orbital carinae not united, the former becoming obsolete approximately halfway towards the latter; anterior angles of pronotum punctate; central area of metasternum impunctate, or, with not more than two impressions. Length: 17–33 mm. . . . *dentatus* Fab.

V. Annotated List of Species.

Two references only are quoted under each genus and species in the list below, the first to the original description, and the second to the most recent publication. It has been considered advantageous to include the complete list of synonyms, with their original references, in view of the involved synonymy of many of the species.

The distribution of those species which extend beyond the continent of Australia has been indicated as fully as possible but, in this connection, it should be borne in mind that the records for most of the Passalidae are far from complete owing to the little authentic distributional data published.

The species appear under the genera in the order of date of publication of the original description.

Passalidae.

I. Aulacocyclinae.

The characters which separate the Aulacocyclinae indicate that it is the most isolated of all the subfamilies from the morphological standpoint. Notes on the distribution of the species have been published (7). The Australian species all belong to the genus *Aulacocyclus*. The allied non-Australian genera contain a total number of fifteen species, of which one occurs in China, one in Japan and the remainder in the regions of the Himalayas, Malay Archipelago and Philippine Islands.

The discontinuity of the distribution suggests that the Aulacocyclinae are ancient in descent and have been in greater evidence in the past than at the present time.

1. *Aulacocyclus* Kaup.

Kaup, 1868, *Col. Hefte* **3** : 4.
Hincks & Dibb, 1935, *Col. Cat.* **142** : 8.

(Type: *Passalus edentulus* MacLeay.)

Eleven species of the genus have been recorded from Australia out of a total number of twenty-three. The general distribution includes the Malay Peninsula, Philippine Islands, New Guinea and neighbouring islands, and New Caledonia.

1. *A. edentulus* MacLeay.

MacLeay, 1827, *in* King *Narrative Survey Coasts Australia*, **2** : 439 (*Passalus*).
Hincks & Dibb, 1935, *Col. Cat.* **142** : 9.

Synonyms :—*cylindraceus* Perch. 1835, *Monogr. Passal.* : 103 (*Passalus*). *furcicornis* Boisd. 1832, *Voy. Astrolabe* : 242 (*Passalus*). *teriodes* 1891, Kuw., *Deuts. ent. Z.* **1891** : 170.

Distribution :—Australia : Queensland, Victoria, N.S. Wales.

2. *A. teres* Perch.

Percheron, 1841, *Mag. Zool.* **11** : 39 (*Passalus*).
Hincks & Dibb, 1935, *Col. Cat.* **142** : 11.

Distribution :—Australia : Queensland, Victoria, N.S. Wales.

The largest species of the genus. Easily recognisable by its size alone and apparently fairly abundant where it occurs.

3. *A. deyrollei* Kaup.

Kaup, 1868, *Col. Hefte* **3** : 7.
Hincks & Dibb, 1935, *Col. Cat.* **142** : 9.

Distribution :—Australia : Queensland, Victoria.

One of the species in which the structure of the central tubercle indicates close affinities to the non-Australian genus *Taeniocerus* Kaup.

4. *A. rosenbergi* Kaup.

Kaup, 1868, *Col. Hefte* **3** : 7.
Hincks & Dibb, 1935, *Col. Cat.* **142** : 10.

Synonym :—*percheroni* Kaup, 1868, *Coleopt. Hefte* **3** : 8.

Distribution :—Australia.

The synonymy of *A. percheroni* with *A. rosenbergi* was established by Kaup, but the fact that he first gives Nias Island as the origin of *A. rosenbergi* and subsequently Nias and Australia, raises a doubt whether the insects are the same species. I have seen a single example only which agrees with the description of *A. rosenbergi* and this possessed no more detailed locality than Australia.

5. *A. kaupi* MacLeay.

MacLeay, 1871, *Trans. ent. Soc. N.S.W.* **2** : 173.
Hincks & Dibb, 1935, *Col. Cat.* **142** : 10.

Distribution :—Australia : Queensland.

This species closely resembles *A. errans* Blkb. and the few characters by which it has been differentiated are doubtfully specific. The central tubercle is longer and the punctures in the dorsal striae more distinct than in *A. errans*.

6. *A. mastersi* MacLeay.

MacLeay, 1871, *Trans. ent. Soc. N.S.W.* **2** : 174.
Hincks & Dibb, 1935, *Col. Cat.* **142** : 10.

Synonym :—*foveipunctatus* Kuw. 1897, *Nov. Zool.* **4** : 278. (**n. syn.**).

Distribution :—Australia : Queensland, Victoria, N.S. Wales.

There is little doubt that Kuwert's *T. foveipunctatus* is correctly synonymised under the above species. It was placed by its describer in the genus *Taeniocerus*

owing to the shape of the central tubercle. The unsatisfactory use of that character for the separation of the genera *Aulacocyclus* and *Taeniocerus* has been discussed (7).

7. *A. macleayi* (Kaup).

Kaup, 1871, *Berlin ent. Z.* **15** (suppl.) : 22 (*Caulifer*).
Hincks & Dibb, 1935, *Col. Cat.* **142** : 10.

Distribution :—Australia : Sydney.

This species, which differs from the remaining species of the genus by having a distinctive ridge pattern of the head, as well as in minor characters, was originally described under the genus *Caulifer* Kaup. It is doubtful whether *A. macleayi* has been recognised since it was described.

8. *A. collaris* Blkb.

Blackburn, 1896, *Trans. Roy. Soc. S. Austr.* **20** : 233.
Hincks & Dibb, 1935, *Col. Cat.* **142** : 8.

Distribution :—Australia.

The only example examined is the type in the British Museum collection which is labelled Australia without any further details.

9. *A. errans* Blkb.

Blackburn, 1896, *Trans. Roy. Soc. S. Austr.* **20** : 233.
Hincks & Dibb, 1935, *Col. Cat.* **142** : 9.

Synonyms :—*fracticornis* Kuw. 1891, *Deuts. ent. Z.* **35** : 170. *rotundatoclypeatus* Kuw. 1891, *loc. cit.* : 170. *arcuatoclypeatus* Kuw. 1891, *loc. cit.* : 170.

Distribution :—Australia : Queensland, N.S. Wales. New Guinea : Fly River.

Judging by the number of specimens available for examination, this species appears to occur in large numbers. The New Guinea form was named *A. arcuatoclypeatus* by Kuwert but I can indicate no specific characters by which it can be differentiated from *A. errans*.

10. *A. aliicornis* Kuw.

Kuwert, 1897, *Nov. Zool.* **4** : 278.
Hincks & Dibb, 1935, *Col. Cat.* **142** : 8.

Synonym :—ab. *sulcatipons* Kuw. 1897, *Nov. Zool.* **4** : 279.

Distribution :—Australia : Queensland.

11. *A. gravelyi* Dibb.

Dibb, 1933, *Ent. mon. Mag.* **69** : 104.
Hincks & Dibb, 1935, *Col. Cat.* **142** : 10.

Distribution :—Australia.

The two examples of this species in coll. Hincks & Dibb comprise the type and another, and neither specimen bears detailed locality label.

II. Macrolininae.

The Macrolininae is the largest subfamily in the Indo-Australian region. It contains 126 species, of which twenty have been recorded from Australia.

The very closely allied genera *Mastochilus*, *Pharochilus*, *Analaches* and

Cetejus have the simplest structure of the subfamily which lead Gravely (14) to suggest that the remaining more highly specialised genera have descended from them. *Notocetius* is also somewhat closely related to the four genera above mentioned.

The genera containing asymmetrical species are *Analaches, Cetejus, Labienus, Protomocoelus* and *Gonatas.*

2. *Mastochilus* Kaup.

Kaup, 1868, *Col. Hefte* **3** : 19 (*Mastachilus*).
Hincks & Dibb, 1935, *Col. Cat.* **142** : 87.

Type : *Passalus polyphyllus* MacLeay.

Five of the seven species are Australian, the remaining two being confined, so far as is known, to New Guinea.

12. *M. polyphyllus* MacLeay.

MacLeay, 1827, *in* King *Narrative Survey Coasts Australia,* **2** : 439 (*Passalus*).
Hincks & Dibb, 1935, *Col. Cat.* **142** : 88.

Synonyms :—*sexdentatus* Eschsch. 1829, *Mem. Soc. Nat. Moscow.* **7** (*Nouv. Mem.* **1**) : 23 (*Passalus*). *hexaphyllus* Dejean 1837, *Cat.* (Ed. 3) : 194 (*Passalus*). *impressicollus* Boh. 1858, *Eugenies Resa* **1**, *Col.* 40 (*Passalus*). *abdominipunctatus* Kuw. 1898, *Nov. Zool.* **5** : 335 (*Mastachilus*) (**n. syn.**).

Distribution :—Australia : Queensland, N.S. Wales.

M. abdominipunctatus Kuw. was tentatively placed as a synonym of this species in the *Coleopterorum Catalogus* (11) pending further investigation. It was originally differentiated by the more extensive punctation of the penultimate and last abdominal segment, together with the slightly different shape of the scars upon the mentum. The first character has been found to be variable in *M. polyphyllus*, and the other one alone I do not consider sufficiently distinct to base upon it a separate species.

13. *M. australasicus* (Perch.).

Percheron, 1841, *Mag. Zool.* **11** : 6 (*Passalus*).
Hincks & Dibb, 1935, *Col. Cat.* **142** : 88.

Synonyms :—*macleayi* Kaup 1868, *Col. Hefte* **3** : 20 (*Mastachilus*). *mulleri* Kuw. 1891, *Deuts. ent. Z.* **1891** : 165. *perinvitus* Kuw. 1891, *loc.cit.*, 165. *distans* Kuw. 1898, *Nov. Zool.* **5** : 328 (*Episphenoides*).

Distribution :—Australia : Queensland, Victoria, N.S. Wales.

14. *M. parvifrons* (Kuw.).

Kuwert, 1891, *Deuts. ent. Z.* **1891** : 165 (*Episphenoides*).
Hincks & Dibb, 1935, *Col. Cat.* **142** : 88.

Distribution :—Australia.

The characters used for the differentiation of this species from *M. quaestionis* Kuw. are somewhat unsatisfactory. The transverse ridge between the inner tubercles is sometimes affected by wear, making it difficult to ascertain with certainty whether it has been joined to the tubercles. On the other hand, the describer gives the length of *M. parvifrons* as 39 mm., which is much smaller than any examples of the very closely related *M. quaestionis* I have seen—44 mm., being the smallest. Gravely (13) gave 44–51 mm. for the length of *M. quaestionis.*

15. *M. quaestionis* (Kuw.).

Kuwert, 1891, *Deuts. ent. Z.* **1891** : 165 (*Episphenoides*).
Hincks & Dibb, 1935, *Col. Cat.* **142** : 89.

Synonyms :—*? lottinii* Boisd. 1835, *Voy. Astrolabe*, **2** : 243 (*Passalus*) (**n. syn.**). *capitalis* Blkb. 1900, *Proc. Roy. Soc. Vict.* (n.s.) **12** : 209.

Distribution :—Australia : N.S. Wales.

Passalus lottinii Boisduval is here synonymised with the above species and as considerable controversy has arisen, regarding this name, the reasons for the suggested synonymy are set forth at length.

The name *lottinii* was originally recognised by Dupont, but the species it represented was first described by Boisduval (3) more than a century ago. No subsequent author has been able to recognise the species. Most authors have not considered the description to be detailed enough either to place *lottinii* as a synonym of another established species or to offer a description of the required characters to treat it as a " good " species.

After a lapse of more than a hundred years I cannot be presumptuous in concluding that whatever species Boisduval's description was supposed to represent, that species has subsequently been redefined under another name. Moreover, in the most unlikely event of *M. lottinii* being a distinct species, I still consider that until its unique characters have been referred to in print the proper course is to allocate the name as a synonym to that species which best includes its few known characters. The discussion which follows is based upon the assumption that *M. lottinii* is of Australian origin, as indicated by its describer.

The original description is as follows :—

" Niger, thorace quadrato, subconvexo, laevissimo, linea media impressa, lateribus fulvo-barbatis; elytris subconvexis, profunde striatis, striis laevibus, interstitiis latis."

In addition to the above description the following details are given :—

" Noir, avec le corselet carré, un peu convexe, entièrement lisse, marqué d'une ligne médiane enfoncée, et garni de poils fauves sur les côtés; élytres un peu convexes, profondément striées; leurs stries entièrement lisses et les intervalles larges.

Cette éspèce est la plus grande de toutes celles qui ont éte rapportées de la Nouvelle-Hollande. Elle égale presque le *Grandis*. Elle fait partie du cabinet de M. Dupont."

A scrutiny of the above description provides the following points, which may be considered of some importance in differentiating the species of *Mastachilus*.

1. Median line of pronotum distinct.
2. Intervals between elytral striae wide.
3. Elytral striâe impunctate.
4. The largest Australian species almost equalling *M. grandis*. (*Aceraius grandis* Burm.).

Taking the above points seriatim and applying them to all the species of *Mastochilus*, these conclusions may be drawn.

Point 1. Characterises *M. polyphyllus* MacLeay. At the same time a median line on the pronotum is present in *M. quaestionis* Kuw., but not always distinct.

Point 2. Applies to all the species with a possible bias in favour of *M. quaestionis*.

Point 3. One can only assume that the dorsal striae are referred to, as the lateral striae are punctate in all the species. The species having impunctate dorsal striae are *M. australasicus* Perch. and *M. quaestionis*.

Point 4. I consider this remark of great significance as it is by the character of size that one can place the species in the genus *Mastochilus*. The only other Australian PASSALIDAE approaching the size of the large species of *Mastochilus* are *Labienus inaequalis* Grav. and *Protomocoelus australis* Boisd. The first is eliminated, since the head is obviously asymmetrical, the form more cylindrical and the dorsal striae distinctly punctate. The latter species can also be ruled out, as it not only possesses basic characters of differentiation but was also characterised by Boisduval, who is unlikely to have described the same species twice.

The question of the size of *M. lottinii* was completely overlooked by Blackburn (2), who wrote concerning Boisduval's original description " giving no information concerning the size." Admittedly the latin diagnosis does not refer to size, but the remarks immediately following give a most useful comparative indication of this character.

Although *Aceraius grandis* was not described until 1847 by Burmeister, it was probably known in the collection of Dupont as *A. grandis* and thereby to Boisduval at the time he described *M. lottinii*. The length of *A. grandis* Burm. varies from 40–60 mm. If one assumed that the *A. grandis* referred to by Boisduval is of average size (*i.e.*, 50 mm.), this is the approximate length of large examples of *Mastochilus australasicus* Perch. and of average sized examples of *M. quaestionis* Kuw.

To summarise the foregoing remarks, the evidence is more strongly in favour of *M. lottinii* being synonymous with *M. quaestionis* than with any of the other species of *Mastochilus*, although point 1 conflicts even with *M. quaestionis*.

In view of the above I suggest that the best course is to place *M. lottinii* in the position of probable synonym of *M. quaestionis* rather than leave it in the list indefinitely as a distinct but unrecognisable species. It is not proposed at the present stage to alter the name *M. quaestionis* by a rigid application of the law of priority, owing to the doubt which still exists.

3. *Pharochilus* Kaup.

Kaup, 1868, *Coleopt. Hefte* **3** : 20.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 89.

(Type : *Passalus dilatatus* Dalm.)

The genus contains six species, which are all Australian.

16. *P. dilatatus* (Dalm.).

Dalman : *in* Schönherr, 1817, *Syn. Ins. Käfer* **1** (3) : 334 (*Passalus*).
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 89.

Synonyms :—*crenistriatus* Boisd. 1835, *Voy. Astrolabe*, **2** : 244 (*Passalus*). *chevrolati* Perch. 1835, *Monogr. Passal.* : 26 (*Passalus*). *cancrus* Perch. 1844, *Mag. Zool.* **14** : 4 (*Passalus*). *caffer* Kuw. 1891, *Deuts. ent. Z.* **1891** : 164 (*Tiberius*).

Distribution :—AUSTRALIA : Queensland, N.S. Wales.

17. *P. politus* (Burm.).

Burmeister, 1847, *Handb. Ent.* **5** : 465 (*Passalus*).
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 89.

Synonyms :—*dilatatus* Perch. 1835, *Monogr. Passal.* : 29. *languidilabris* Kuw. 1891, *Deuts. ent. Z.* **1891** : 166. *rugiceps* Westw. : *in* Hope 1845, *Cat. Lucanid. Coleopt.* : 28 (*Passalus*). *bilineatopunctatus* Kuw. 1891, *Deuts. ent. Z.* **1891** : 166. *brevidentatus* Kuw. 1898, *Nov. Zool.* **5** : 332. *compar* Kuw., *loc. cit.*, 333.

Distribution :—Australia : Queensland, Victoria, N.S. Wales, Tasmania. The most abundant and widely distributed species of the genus.

18. *P. nitidulus* MacLeay.

MacLeay, 1871, *Trans. ent. Soc. N.S. Wales* **2** : 175.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 89.

Distribution :—Australia : N.S. Wales.

19. *P. puncticollis* MacLeay.

MacLeay, 1871, *Trans. ent. Soc. N.S. Wales* **2** : 175.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 90.

Distribution :—Australia : Queensland.

20. *P. scutellonotus* Kuw.

Kuwert, 1898, *Nov. Zool.* **5** : 333.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 90.

Synonym :—*pararius* Kuw. 1898, *Nov. Zool.* **5** : 334 **(n. syn.)**.

Distribution :—Australia.

Kuwerts' *P. pararius* is here synonymised with this species, as the characters by which he separated it are not considered of specific distinction. Kuwert himself remarked that it was perhaps only a variety of *P. scutellonotus*.

21. *P. punctiger* Grav.

Gravely, 1918, *Mem. Indian Mus.* **7** : 99.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 90.

Distribution :—Australia : N.S. Wales.

The dorsal aspect of the head of *P. punctiger* is unlike any of the other species of the genus, owing to the absence of the frontal carinae between the inner and outer tubercles and the carina uniting the inner tubercles. The configuration of the head is superficially similar to that of *Notocetius cornutus* H. & D., but in the latter species the carinae between the central tubercle and inner tubercles are also obsolete.

4. *Analaches* Kuw.

Kuwert, 1891, *Deuts. ent. Z.*, **1891** : 167.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 90.

(Type : *A. puberilis* Kuw.)

The genus contains four species which are centred in New Guinea, but *A. australiensis* Stol. is the only one extending to Australia and being recorded from N.S. Wales as well as from Queensland.

22. *A. australiensis* (Stol.).

Stoliczka, 1873, *J. asiat. Soc. Bengal*, **42** (2) : 157 (*Cetejus*).
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 90.

Distribution :—Australia : Queensland, N.S. Wales. New Guinea. The head is strongly asymmetrical in this species.

5. *Cetejus* Kaup.

Kaup, 1871, *Berlin ent. Z.* **15** (Suppl.) : 53.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 91.

(Type : *Acerains virginalis* Kaup.)

It seems probable that the number of species in the genus *Cetejus* will be reduced by synonymy when the types become available. In the *Coleopterorum Catalogus* (11) the number given is sixteen, all from New Guinea, the neighbouring islands and the Louisade Archipelago, with the exception of *C. obliquus* Kirsch, recorded from the island of Jobi. It is doubtful, however, whether this species is Australian, for the reasons summarised below.

23. *C. obliquus* Kirsch.

Kirsch, 1877, *Mitt. zool. Mus. Dresden* **2** : 140.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 92.

Distribution :—Jobi. Australia ?

The only evidence that this species occurs in Australia is the reference by Kuwert (18), from which it appears doubtful whether he recognised the true *C. obliquus* of Kirsch. Subsequent distributional data throws still further doubt upon the matter. I am indebted to Mr. W. D. Hincks for kindly passing over to me his unpublished notes on two examples of this distinctive species which he has recently examined. The first was a paratype in the collection of the Dresden Museum from Ansus (in Jobi). The second example, recently collected in New Guinea by Miss Cheesman, is now in the British Museum. The notes contain detailed descriptions of the specimens from which the diagnosis in Section IV (ante) has been extracted.

6. *Notocetius* Hincks & Dibb.

Hincks & Dibb, 1935, *Ent. mon. Mag.* **71** : 272.

(Type : *N. cornutus* Hincks & Dibb.)

A monotypic genus. The important feature is the absence of the frontal carinae which, together with the other characteristics, makes this genus easily recognisable.

24. *N. cornutus* Hincks & Dibb.

Hincks & Dibb, 1935, *Ent. mon. Mag.* **71** : 273.

Distribution :—Australia : Malanda, N. Queensland.

7. *Labienus* Kaup.

Kaup, 1871, *Berlin ent. Z.* **15** (Suppl.) : 39.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 92.

(Type : *Eriocnemis ptox* Kaup.)

The zoogeographical centre for the genus is New Guinea, and of sixteen species only one occurs in Australia.

25. *L. inaequalis* Grav.

Gravely, 1918, *Mem. Indian Mus.* **7** : 104.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 94.

Distribution :—Australia : Queensland; New Guinea, Aru Is., Ternate.
An asymmetrical species.

8. *Protomocoelus* Zang.

Zang, 1906 (1905), *Zool. Anz.* **29** : 154.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 95.

(Type : *Passalus australis* Boisd.)
The genus contains seven species and includes New Guinea and the surrounding islands, Solomon Is., and Woodlark I., in its geographical distribution. One species only occurs in Australia and it is widely distributed.

26. *P. australis* (Boisd.).

Boisduval, 1835, *Voy. Astrolabe* **2** : 246.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 95.

Synonyms :—*foveicollis* Montr. 1855, *Ann. Soc. Agric. Lyon* (2) **7** : 28 (*Passalus*). *salomonis* Kaup 1871, *Berlin ent. Z.* **15** (suppl.) : 39 (*Pelops*). *impressicollis* Kuw. 1891, *Deuts. ent. Z.* **1891** : 168 (*Pelops*). *gestroi* Kirsch 1879, *Ann. Mus. civ. Genova*, **14** : 18. *vogeli* Kuw. 1898, *Nov. Zool.* **5** : 320 (*Pelops*). *fallax* Kuw. 1898, *loc. cit.* : 320.
Distribution :—Australia, Ceram, Waigiou, New Guinea, Sudest I., Kei Is., Aru Is., New Britain, Solomon Is., Woodlark I.
An asymmetrical species.

9. *Gonatas* Kaup.

Kaup, 1871, *Berlin ent. Z.* **15** (suppl.) : 50.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 96.

(Type : *Passalus naviculator* Perch.)
The genus contains eleven species, of which five of those most widely distributed occur in Australia.

27. *G. naviculator* (Perch.).

Percheron, 1844, *Mag. Zool.* **15** : 1 (*Passalus*).
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 97.

Synonym :—*peregrinus* Kuw. 1898, *Nov. Zool.* **5** : 315.
Distribution :—Australia, Java, Philippines, Batchian, Ceram, Jobi, Mysole, Amboina, Saparua I., New Guinea, Dore, Mafor.

28. *G. pumilio* (Kaup).

Kaup, 1868, *Coleopt. Hefte* **4** : 6 (*Aceraius*).
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 97.

Distribution :—Australia : Queensland; Ceram, Amboina, New Guinea, Louisade Arch.
The first record of this species occurring in Australia is based upon a single specimen in the Berlin Entomological Museum which bears the label—Coen Distr., Cape York, Queensland (H. Hacker).

29. *G. germari* (Kaup).

Kaup, 1868, *Coleopt. Hefte* **3** : 30.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 96.

Synonym :—*brevis* Kuw. 1898, *Nov. Zool.* **5** : 315 (*germari* ab.).
Distribution :—Australia : Queensland; Java, Halmahera, Ternate, Batchian, Buru, Ceram, Great Banda, Kei Is., New Guinea.

30. *G. minimus* Kuw.

Kuwert, 1891, *Deuts. ent. Z.* **1891** : 169.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 97.

Distribution :—Australia, New Guinea, New Britain, Solomon Is.
The inclusion of this species in the Australian fauna is based upon one example quoted by Gravely (14).

31. *G. schellongi* Kuw.

Kuwert, 1891, *Deuts. ent. Z.* **1891** : 169.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 97.

Synonyms :—*tridentatus* Kuw. 1891, *Deuts. ent. Z.* **1891** : 169. *differens* Kuw., *loc. cit.* (*schellongi* var.). *albertisi* Kuw., *loc. cit.* *major* Kuw., *loc. cit.* *novaebritanniae* Kuw. 1898, *Nov. Zool.* **5** : 314. *tibialis* Zang, 1905, *Deuts. ent. Z.* **1905** : 110.

III. Leptaulacinae.

This subfamily contains at present eighteen species and two genera, and the two species which are included in the Australian fauna are representatives of the most widely distributed species in the Passalidae. The geographical distribution of the subfamily includes the Oriental and Austro-Malayan regions.

A specific variation in structure is present in most of the species, and the difficulties of establishing the true limits of such variation resulted in the early descriptions of a large number of forms, which a subsequent influx of specimens have proved to be synonymous with the variable species. The character of size is one which varies extremely in this subfamily. It is no uncommon occurrence to meet with a Leptaulacine species in which the maximum forms are more than twice the length of the smallest individuals.

Following Gravely's researches into the variation in the species of the genus *Leptaulax*, the position has been greatly clarified by the synonymy he indicated (13) (14) and the number of species reduced to sixteen. Nevertheless the close relationship of the species presents difficulties in their differentiation.

The two Australian species are both referable to the genus *Leptaulax* Kaup.

10. *Leptaulax* Kaup.

Kaup, 1868, *Coleopt. Hefte* **3** : 11.
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 99.

(Type : *Passalus dentatus* Fab.)
The two Australian species fall into different sections of the genus and are easily separated by the differentiation in the cephalic carinae.

32. *L. bicolor* (Fab.).

Fabricius, 1801, *Syst. Eleuth.* **2** : 256 (*Passalus*).
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 100.

Synonyms :—*innocuus* Dej., 1837, *Cat. Col.* (3rd Ed.) : 195 (*Passalus*). *vicinus* Perch., 1844, *Mag. Zool.* **14** : 11 (*Passalus*). *eschscholtzi* Kaup, 1868, *Coleopt. Hefte* **3** : 14. *manillae* Kuw., 1891, *Deuts. ent. Z.* **1891** : 188. *malacae* Kuw., *loc. cit. dindigalensis* Kuw., 1898, *Nov. Zool.* **5** : 287. *novaeguineae* Kuw., 1891, *Deuts. ent. Z.* **1891** : 188. *morator* Kuw., 1898, *Nov. Zool.* **5** : 287 (*novaeguineae* ab.). *hausemanni* Kuw., *loc. cit. batchianae* Kuw., 1891, *Deuts. ent. Z.* **1891** : 188. *roepstorfi* Kuw., 1898, *Nov. Zool.* **5** : 288. *cicatricosus* Kuw., 1891, *Deuts. ent. Z.* **1891** : 189. *consequens* Kuw., *loc. cit.* : 188. *subsequens* Kuw., *loc. cit.* : 189 (*differentispina* var.). *incipiens* Kuw., *loc. cit. sumatrae* Kuw., 1898, *Nov. Zool.* **5** : 290. *calcuttae* Kuw., 1891, *Deuts. ent. Z.* **1891** : 189 (*abdominisculptus* var.). *abdominisculptus* Kuw., *loc. cit. geminus* Kuw., 1898, *Nov. Zool.* **5** : 292. *sequens* Kuw., *loc. cit. obtusidens* Kuw., 1891, *Deuts. ent. Z.* **1891** : 188. *niae* Kuw., 1898, *Nov. Zool.* **5** : 294. *aurivillii* Kuw., 1891, *Deuts. ent. Z.* **1891** : 189. *tenesserimensis* Kuw., 1898, *Nov. Zool.* **5** : 295. *evidens* Kuw., *loc. cit. differentispina* Kuw., 1891, *Deuts. ent. Z.* **1891** : 189. *separandus* Kuw., *loc. cit.* : 190. *maxillonotus* Kuw., *loc. cit.* (*separandus* var.). *medius* Kuw., *loc. cit.* (*separandus* var.). *divaricatus* Kuw., 1898, *Nov. Zool.* **5** : 300 (*medius* ab.). *rugulosus* Zang, 1905, *Deuts. ent. Z.* **1905** : 100 (*Leptaulacides*). *fruhstorferi* Zang, *loc. cit.* : 102 (*Leptaulacides*). *andamanarum* Zang, *loc. cit.* : 166 (*Leptaulacides*). *palawanicus* Zang, *loc. cit.* : 232 (*Leptaulacides*). *anaulax* Zang, *loc. cit.* : 235 (*Leptaulacides*). *nietneri* Zang, *loc. cit.* : 246 (*Leptaulacides*). *papuanus* Zang, 1906, *Nova Guinea*, **5** (1) : 23 (*Leptaulacides*). *analis* Zang, 1906, *loc. cit.* **1906** : 24 (*Leptaulacides*).

Distribution :—Australia, India, Ceylon, Formosa, Siam, Tonkin, Malay Peninsula, Java, Borneo, Philippines, Moluccas, New Guinea.

33. *L. dentatus* (Fab.).

Fabricius, 1792, *Ent. Syst.* **1** (2) : 241 (*Passalus*).
Hincks & Dibb, 1935, *Coleopt. Cat.* **142** : 102.

Synonyms :—*quadridentatus* Sturm, 1826, *Cat. Ins.-Samml.* **1** : 182 (*Passalus*). *timoriensis* Burm., 1847, *Handb. Ent.* **5** : 473 (*Passalus*). *bicolor* Stol., 1893, *J. asiat. Soc. Bengal* **42** (2) : 155. *abdominibarbatus* Kuw., 1898, *Nov. Zool.* **5** : 293. *malitiosus* Kuw., *loc. cit.* 1898 : 296. *submedius* Kuw., *loc. cit. siagonicus* Kuw., 1891, *Deuts. ent. Z.* **1891** : 189. *indicus* Kuw., *loc. cit.* (*celebensis* var.). *insignis* Kuw., 1898, *Nov. Zool.* **5** : 297 (*indicus* ab.). *exterris* Kuw., *loc. cit. darjeelingi* Kuw., 1891, *Deuts. ent. Z.* **1891** : 190. *celebensis* Kuw., *loc. cit.* **1891** : 189. *mixtus* Kuw., 1898, *Nov. Zool.* **5** : 298. *interponendus* Kuw., 1898, *loc. cit.* **1898** : 299. *bornensis* Kuw., 1891, *Deuts. ent. Z.* 1891 : 189 (*celebensis* var.). *ribbei* Kuw., 1891, *loc. cit.* **1891** : 188. *geminatus* Kuw., 1898, *Nov. Zool.* **5** : 300. *tonkinensis* Zang, 1905, *Deuts. ent. Z.* **1905** : 102. *humerosus* Zang, 1905, *loc. cit.* **1905** : 112. *glabriventris* Grav., 1914, *Mem. Indian Mus.* **3** : 255.

Distribution :—Australia, India, China, Formosa, Lower Burma, Siam, Malay Peninsula, Sumatra, Java, Borneo, Philippines, Celebes, New Guinea.

VI. Selected Bibliography.

It has not been considered necessary to append a complete bibliography to the Australian Passalidae, in view of the recently published world catalogue of the family and the references quoted under genera and species in Section II ante. Most of the important works containing information on the Australian species have been discussed in the text of Sections I, III, IV and V and listed below in alphabetical order of authors.

(1) Arrow, G. J., 1910, *Fauna of British India*, Lamellicornia, **1** : 22–23.
(2) Blackburn, T., 1900, On Some New Genera and Species of Australian Coleoptera. *Proc. Roy. Soc. Victoria*, **12** : 207–211.
(3) Boisduval, J., 1835, *Voyage de l'Astrolabe*, 1826–1829, **2** *Faune Ent. de l'Océan Pac.* : 241–247.
(4) Dibb, J. R., 1932, Variation in Three Species of the Genus *Aulacocyclus*. *Ent. mon. Mag.* **68** : 31–32.
(5) ——, 1932, The Australian Species of the Genus *Aulacocyclus*. *Stylops*, **1** : 257–263, 9 figs.
(6) ——, 1933, A New Species of *Aulacocyclus* from Australia. *Ent. mon. Mag.* **69** : 103–104.
(7) ——, 1933, Notes on the Aulacocyclinae. *Ent. mon. Mag.* **69** : 195–200.
(8) ——, 1935, Some Passalidae in the Collection of the Berlin Entomological Museum. *Ent. mon. Mag.* **71** : 79–81.
(9) Hincks, W. D., 1933, Notes on the Passalidae. No. 2. Flightless Species. *Ent. mon. Mag.* **69** : 10–13, 3 figs.
(10) ——, 1935, Notes on the Passalidae. No. 5. Synonymic Notes, with the Descriptions of a New Genus and New Species. *Ent. mon. Mag.* **71** : 50–54.
(11) Hincks, W. D., and Dibb, J. R., 1935, *Coleopterorum Catalogus*, Passalidae, **142** : 1–118.
(12) —— ——, 1935, A New Genus and Species of Passalidae from Australia. *Ent. mon. Mag.* **71** : 272–274, 2 figs.
(13) Gravely, F. H., 1914, An Account of the Oriental Passalidae. *Mem. Indian Mus.* **3** : 177–353, 8 figs., 3 pl.
(14) ——, 1918, Revision of the Passalidae of the World. *Mem. Indian Mus.* **7** : 1–144, text-figs.
(15) Kaup, J. J., 1871, Monographie der Passaliden. *Berlin ent. Z.* **15** (suppl.) 1–125, 5 pl.
(16) Kuwert, A., 1896, Die Passaliden dichotomisch Bearbeitet. *Nov. Zool.* **3** : 209–230.
(17) ——, 1897, *loc. cit.* **4** : 274–306.
(18) ——, 1898, *loc. cit.* **5** : 137–205, 259–349, 4 pl.
(19) Masters, G., 1887, A Catalogue of Australian Coleoptera. *Proc. linn. Soc. N.S. Wales* (2) **1** : 27–29.
(20) Ohaus, F., 1909, Bericht über eine entomologischer Studien-Reise in Süd-Amerika. *Stettin. ent. Ztg* **8** : 3–139.
(21) Percheron, A., 1835, *Monographie de Passales*.